

In one specific case (1879) the figures support the proverb admirably; the rainfall of 3.37 inches during the autumn of 1879, which is the lightest in the record, is followed by the warmest winter, with a mean temperature of 38.6°. But the rainfall of the subsequent autumn, 5.73 inches, which also was very light, was followed by one of the coldest winters. As was to be expected, the records give no confirmation of the Indian proverb, and yet we must believe that Doctor Rush or his adviser believed in it as having some foundation in experience. Possibly some one or two notable cases had recently occurred to establish this idea in their minds. But we see that this old Indian rule has neither practical nor scientific value. The special case of 1879, with a possible similar case previous to 1789, or say two cases in a century, merely illustrates the tendency of mankind to generalize from insufficient data. The progress of sound knowledge is hindered by adhering to a belief in such errors, but is fostered by awakening to the absolute necessity of a careful study of reliable statistics.

#### HYGIENE AND CLIMATOLOGY.

The relation between climate and disease is often treated of under the title of nosology, or the geographic distribution of disease, or the classification of diseases and climates. The modern expansive student of geography speaks of the geography of disease. In a recent publication by Prof. R. DeC. Ward<sup>1</sup> he treats this subject under the title "The hygiene of the zones". His article gives a brief survey of the relations between weather and climate on the one hand, and the more important diseases on the other. Twenty years ago, in view of the great advances then being made in hygiene, it may have been proper to say that, with suitable precautions, man can make any climate endurable. It has been shown that the spread of certain diseases is often entirely a matter of personal intercourse and contamination, so that neither the origin nor the spread of such diseases is due to climate directly, tho it may be so by reason of some indirect relationship. There are, however, certain potent climatic influences, and their study is as important to the whole community as it is to the medical profession.

The author discusses briefly the general effects of warmth and cold, high altitude and low, pure air, moisture and dryness, especially desert air, pure and aseptic; ocean air, pure and dust-free; winds, fogs and clouds, and sunlight.

Comparing old notions and new beliefs, Professor Ward says:

The causation of disease is now no longer sought directly in meteorological conditions, but in the effects, more or less direct, of these conditions upon the micro-organisms which are the specific cause of the disease. Atmospheric conditions may help or may retard the development of the micro-organism, and may strengthen or weaken the individual's power of resistance against the attacks of the germ, as well as affect his susceptibility. Thus new views have replaced the old. Winds used to be regarded as the chief agents in spreading epidemics; now it is known that disease can not be carried far by winds, for the micro-organisms do not long maintain their power in the free air and under the sun. Rain has been supposed directly to control the distribution of diseases; now we believe that precipitation acts only indirectly, through drinking water, or through its control of the dust in the air. Dust from dry soil may contain the germs of infectious diseases, and aggravate affections of the respiratory organs. Harmful exhalations are no longer believed to be given off by the soil, but the condition of the soil as to moisture and temperature may affect the development and diffusion of certain micro-organisms. Some parallelism has been discovered between the prevalence of certain diseases, such as diarrhoea and typhoid fever, and soil temperatures or the ground-water level.

#### PALE GREEN SKY TINTS.

In *Nature* for January 24, 1907, page 295, Mr. Arthur W. Clayden of Exeter, England, gives the following explanation

<sup>1</sup> The Hygiene of the Zones, by Robert DeC. Ward, reprinted from the Bulletin of the Geographical Society of Philadelphia, Vol. IV, January, 1906.

of the green tint often seen in that country in the sky during early twilight, but much more rarely seen in the sky at dawn. As these sky tints and colors are excellent indications of the condition of the air as to moisture, we hope that observers may be found here and there in America who have the instruments and leisure to make an accurate record of the location and intensity of the various tints. We have found the pale green closely associated with the delicate patch of pink or rose which is often seen above the sun after sunset and which is supposed to mark the presence of considerable vapor at a very high altitude in a very fine state of subdivision.

Mr. Clayden states:

The color of the sky at any time is made up of two components: *A*, the light from the upper regions; *B*, that reflected from the small particles in the lower air. The *A* component is always blue, and its spectrum shows a deficiency in red and yellow rays. Its light passes between the particles of the lower air and therefore forms a background upon which they are projected. The spectrum of the *B* component is variable. When the sun is well above the horizon the light is white, and the variations in the deepness of the blue of a clear sky are due to differences in the relative proportions of *A* and *B*. As the sun nears the horizon the *B* light begins to lose its more refrangible rays, and the absorption extends toward the green and yellow as the sun goes down.

Now if we take two equally brilliant spectra, cut the red, orange, and yellow from one and the violet and blue from the other, and then mix the residues we shall obviously have all the colors necessary to make white light with a double allowance of green. An eye receiving the whole will see pale green. This, I take it, is the origin of the green colors of the sky. The *A* component is deficient in the less refrangible rays, which are supplied by the *B* component, and the two spectra overlap in the green, showing an excess of that color.

Occasionally, but rarely, the two are exactly complementary over a limited stretch of sky, and then white patches are seen amid the colors of the sunset which are easily distinguished from clouds. They shade off on one side into tints of green where the spectra overlap, into yellow where the *B* component is in excess, and into blue where the *A* light preponderates.

When the sky is clear it is no uncommon thing to see a considerable expanse of green, shading on the one side into pale lemon-yellow where the overlap of the spectra is considerable, while on the other side it shades through a narrow border of silvery tint where the balance is exact into a delicate rosy hue where there is a general deficiency in the central rays.

Green tints are by no means always to be seen, and I think the foregoing explanation shows why—their production depends upon such an adjustment between the brightness of the two components that they shall be approximately equal. The white patches are rarer still, as they require exact equality in brightness and correct apportionment of color.

The Editor has seen it stated that the extensive area of pale green in a clear sunset sky is due to the combination of the blue light that comes from the upper atmosphere and the rosy tint reflected by particles in the lower atmosphere, as blue and red combined give various shades of green; but if patches of white are also to be observed then this explanation fails and Mr. Clayden's becomes more probable. The whole subject of twilight colors was discussed by Prof. Wilhelm von Bezold in a famous memoir on the twilight, published by him in 1864, in Poggendorf's *Annalen*, and reprinted a year ago in his collected papers (*Gesammelte Abhandlungen*, \* \* \* W. von Bezold, Braunschweig, 1906).—EDITOR.

#### AERIAL EXPLORATION ABOVE THE OCEAN.

At the formal opening of the Scottish Oceanographical Laboratory, at Edinburgh, on Wednesday, January 16, 1907, the Prince of Monaco presided, and we quote the following from the account of his public address before the Royal Scottish Geographical Society, on the evening of January 17, as reported in *Nature*, January 24, vol. 75, p. 308:

In the course of his address the Prince said that in the last few years the improvements in the manufacture of steel had made it possible to fly kites at great heights, carrying self-registering apparatus. Also the india-rubber industry has enabled balloons, carrying self-registering apparatus, to be sent to altitudes hitherto inaccessible. Through the liberality of the German Emperor a great establishment had been set up at Lindenberg for the systematic investigation of the upper-air meteorology. This was over the land. In 1904 the lecturer had become interested in the subject and he began to make plans for investigating the